

**Internal Assessment Test 2 – May 2017
Solutions**

Sub: Traffic Engineering

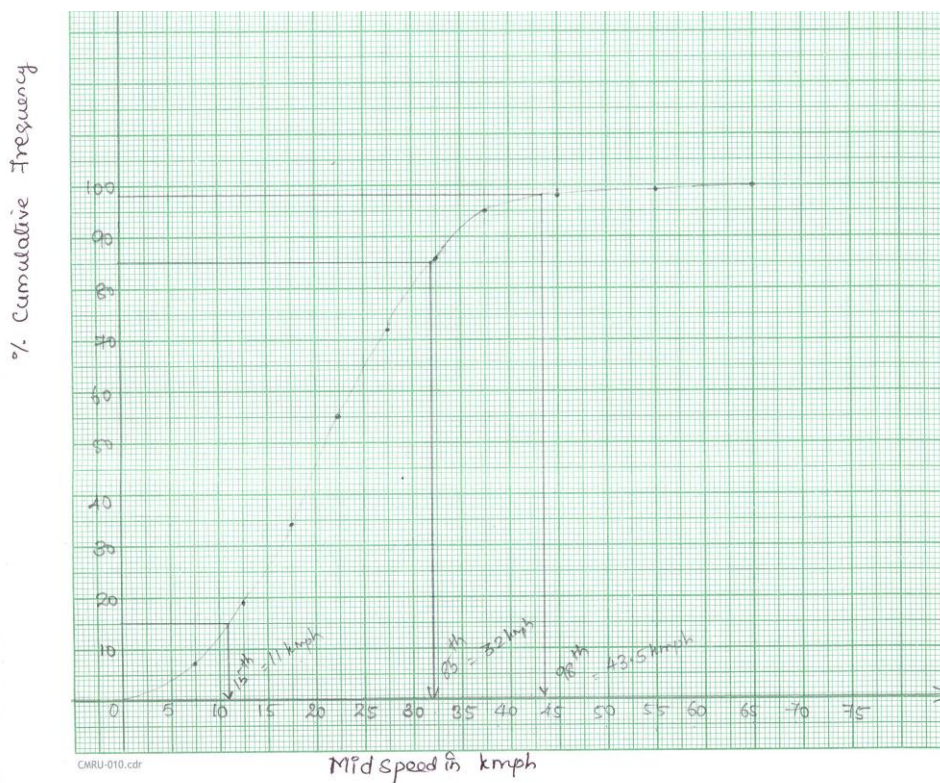
Code: 10CV667

Sem: VI

Branch: CIVIL

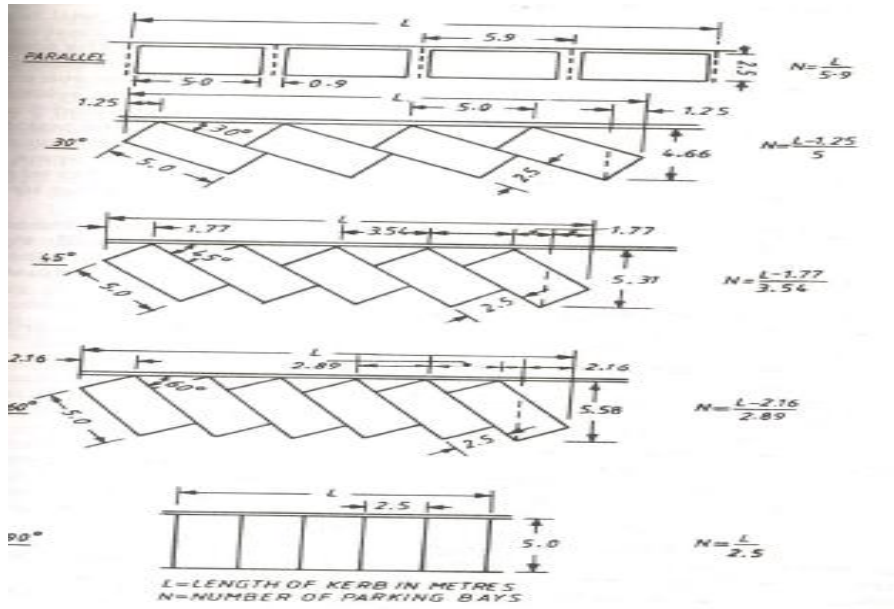
1.

Speed range	Mid speed	Frequency	% Frequency	Cumulative Frequency
5-10	7.5	230	7.2	7.2
10-15	12.5	375	11.8	19
15-20	17.5	500	15.8	34.8
20-25	22.5	680	21.4	56.2
25-30	27.5	525	16.6	72.8
30-35	32.5	430	13.6	86.4
35-40	37.5	290	9.1	95.5
40-50	45	110	3.5	99
50-60	55	25	0.8	99.8
60-70	65	8	0.2	100
Total		3173		



85th percentile speed = 32kmph
 15th percentile speed = 11 kmph
 98th percentile speed = 43.5 kmph

2. On street parking facilities :



3.

Weight of moving vehicle $W_a = 30$ tonnes
Parked vehicle $W_b = 3$ tonnes

Skid distance $S_2 = 16$ m

Friction coefficient, $f = 0.4$

Initial speed = v $S_1 = 50$ m

V_2 = Before collision speed

V_3 = After collision speed

$V_4 = 0$

$S_2 = 16$ m $f = 0.4$

a) After collision:

$$\frac{(W_a + W_b)}{2g} (V_3^2 - V_4^2) = (W_a + W_b) f \cdot S_2$$

$$V_4 = 0$$

$$\frac{V_3^2}{2g} = 0.4 \times 16 \Rightarrow \boxed{V_3 = 11.2 \text{ m/s}}$$

b) At collision:

$$\frac{W_a V_2}{g} = \frac{(W_a + W_b) V_3}{g}$$

$$V_2 = \frac{(W_a + W_b)}{W_a} \cdot V_3$$

$$\boxed{V_2 = 12.32 \text{ m/s}}$$

$$V_1 = \sqrt{2 \times 9.81 \times 0.4 \times 150 + (12.32)^2}$$

$$= 23.31 \text{ m/s}$$

$$V_1 = 83.91 \text{ kmph}$$

4) Collision diagram and condition diagram

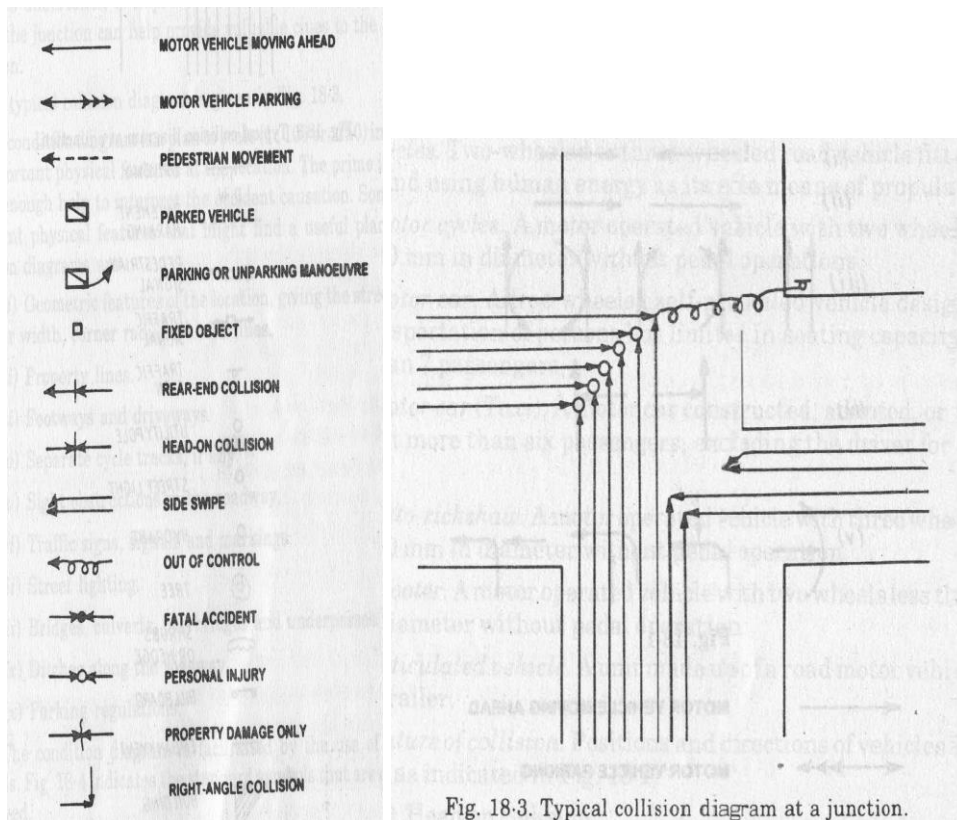
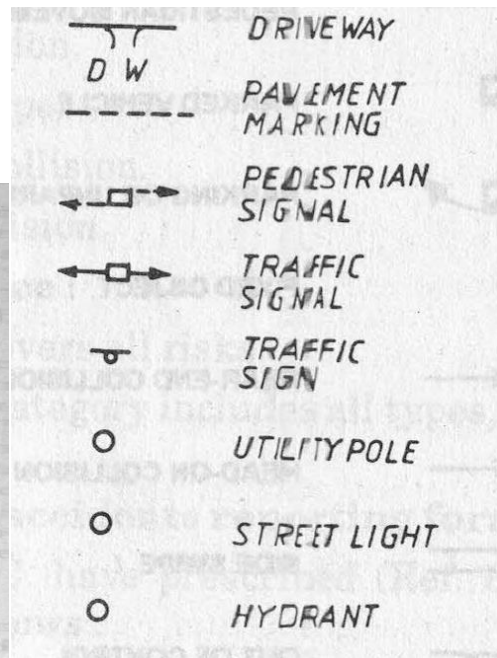
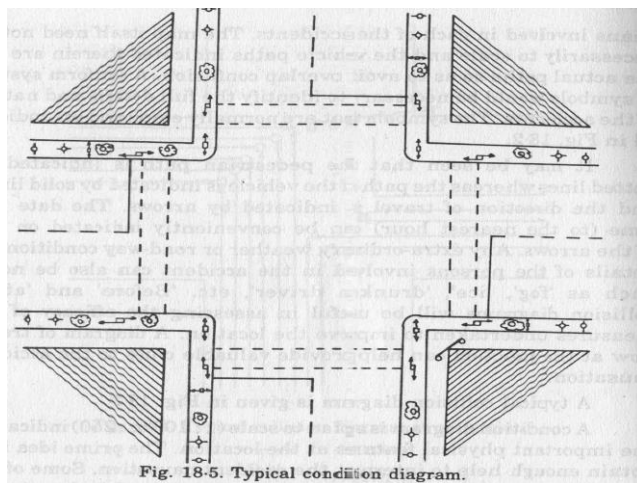


Fig. 18.3. Typical collision diagram at a junction.

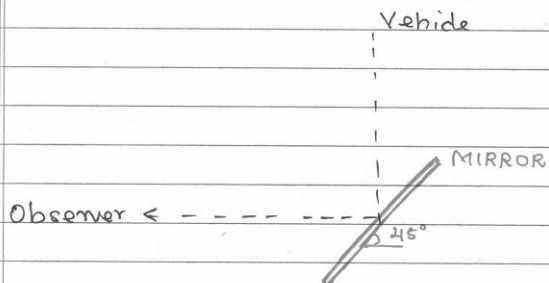


5A) Enoscope method:

- Enoscope:

- It eliminates the parallax effect.

- It is also known as mirror-box is an L-shaped box, open @ both ends, with a mirror set at a 45 degree angle to the arms of the instrument.



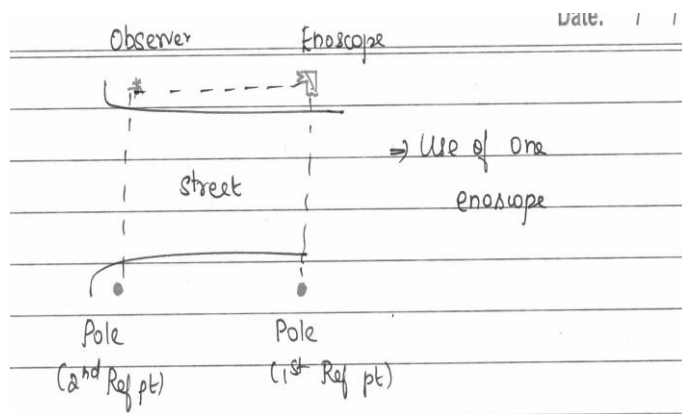
The instrument bends the line of sight of the observer so that it is perpendicular to the path of the vehicle.

This method can be used with one enoscope or with two enoscopes.

One enoscope:

The instrument is placed directly opposite the first reference point & the observer stations himself at the other reference point.

The stop watch is started as soon as the vehicle passes the first reference point and is stopped as soon as it passes the observer.



Two enoscope:

The observer stations himself midway between the two reference points and starts the stop-watch as soon as vehicle crosses the first reference point and stops the stop-watch when it crosses the second reference point

B) Spot speed: It is the instantaneous speed of a vehicle at a specified section or location

Journey speed: it is the overall speed or the effective speed of a vehicle between 2 points

Running speed : the average speed maintained by a vehicle over a particular stretch of road while the vehicle is in movement.

Delay: It is the time lost by traffic during the travel period either due to fixed delays or operational delays

Capacity : It is the maximum number of vehicles in a lane or a road that can pass a given point in unit time.

6) Need of OD study:

To know the exact origin and destination of the trips

Along with the number of trips grouping of trips also can be done

Other information:

- Land use of the O and D zone
- Household characteristics of the trip making family
- Time of the day
- Purpose
- Mode of travel

Presentation of results:

- Vast amount of data
- Representation in the form of table or pictorial form.
- Most convenient form is an O-D matrix – representing origin and destination
- Horizontal axis – destination zones
- Vertical axis – origin zones
- Zones – internal and external zones
- Trips entered in the cells of the matrix

OD matrix

		DESTINATION ZONES											
		INTERNAL					EXTERNAL						
		1	2	3				72	73	74			
ORIGIN ZONES	INTERNAL	1											
		2											
		3											
	EXTERNAL												
		72											
		73											
	74												

t₂₋₃ represents number of trips originating in zone 2 and terminating at zone 3

Desire line chart:

Trips between any pair of zones are represented by a straight line connecting the centroids of the two zones

Having a band width drawn to a suitable scale to represent the actual volume of trips.

